21-241 Exam 1 Information

1 Logistics:

Exam 1 will take place in class on Wednesday October 2nd. It will be 50 minutes long. To receive full credit, you must show all of your work. Notes, calculators, and other technology are prohibited.

There will be no problems related to Julia or coding on the exam. The exam is meant to gauge your level of understanding of the mathematics we have discussed so far. As such, you may only use the concepts discussed in class to solve the exam problems.

The exam will cover the topics discussed during the first five weeks of classes—all topics up to and including the four fundamental subspaces (up to and including Lecture 9/25).

While taking a timed exam can be stressful, keep in mind that you do not have to complete every part of every problem perfectly to do well. Be sure to give yourself time to work on every problem, and show what you know, even if it is not a perfect answer; this can earn you partial credit.

2 Review Session and Office Hours

Recitation on Tuesday, October 1st will be a review session. Moreover, in addition to the usual office hours posted on canvas, I will hold additional office hours on Tuesday, October 1st from 12-2pm in WEH 8123.

3 Practice Exams

There are old exams posted on canvas.

Disclaimer: The old exams are great for practice. However, they were administered by a different professor who covered topics in a slightly different order. So, you should not expect your exam to look exactly like the old exams both in structure and content. For example, the old exams do not contain linear transformation problems; you are, however, expected to know about linear transformations for our exam (for linear transformation practice, revisit the old worksheets, homework, and see the additional problems section below). Moreover, the topic of orthogonality will not appear on your exam; you should disregard any problems related to orthogonality on the practice exams.

4 How Do I Study?

Start by reviewing the lecture notes, homework, and worksheets. If you come across a concept, solution, or proof that you do not understand, drop by office hours as soon as you can to clear things up. It is also a good idea to redo any problems from homework and worksheets that you did not originally know how to do or that you got incorrect.

Once you feel that you have a good understanding of the material, move on to the old exams posted on canvas (but keep in mind the disclaimer above). Take a 50 minute block of time and take the exam without looking at the solutions or your notes. At the end, you can check the solutions to see how you did. If there were particular problems you did not know how to do or that gave you trouble, you can review those concepts again (and come to office hours if you need additional help!). Then, once you are comfortable with those topics, take another pratice exam. Then do it again! If you'd like additional practice problems, see the next section.

5 Additional Problems

The following questions are from the 5th edition of Strang's book. See Strang's website (`https://math.mit.edu/~gs/linearalgebra/ila5/indexila5.html`) for the solutions.

- Problem Set 2.3 # 1, 14, 27
- Problem Set 2.4 # 27, 32, 33
- Problem Set 2.5 # 1, 10, 11, 18, 25, 29
- Problem Set 2.6 # 6, 13
- Problem Set 2.7 # 1, 4, 16
- Problem Set 3.1 # 10, 19, 20
- Problem Set 3.2 # 5, 10, 25
- Problem Set 3.3 # 5, 8, 12, 18
- Problem Set 3.4 # 1, 3, 7, 9, 14, 15, 21, 24
- Problem Set 3.5 # 1, 6, 11, 13
- Problem Set 8.1 # 1, 3, 6, 8

Want more problems? Do more from the textbook!

6 Exam Instructions

The cover sheet of the exam will have the following instructions. Please familiarize yourself with the instructions so that there are no surprises on exam day.

Before The Exam:

- Do not open the exam until instructed to do so.
- Clearly print your name and andrewID in the designated locations above.
- Place your Carnegie Mellon ID on your desk in front of you.
- Turn off your electronic devices and store them, along with your notes and books, out of sight (e.g. in a closed bag)

During The Exam:

- Your work must be shown clearly and legibly with appropriate justifications (using a pencil or eraseable pen is always a good idea).
- Write your solutions only on the pages assigned to the appropriate questions. You may use the extra page(s) at the back of the exam for scratch work or continuing solutions; if you continue your solutions on the extra pages, you should clearly indicate the page number where the solution is continued so the grader will see it. Do not remove any pages from the staples
- You may not use notes, books, other reference materials, or electronic devices.
- If you need to leave the classroom (e.g. to use the restroom), raise your hand, turn in your CMU ID card to a proctor, and leave your electronic devices in the classroom.

After The Exam

- Stop working immediately when you are instructed to do so.
- You must hand in your own exam and you must hand in all pages of your exam.

7 Exam Grades

Your scores on any given problem will be based on correctness, legibility, and justification. If an answer is provided without proper justification (whether that mean a proof or calculation), you will not receive full credit. On this exam in particular, you should expect to see a problem that asks you to put a matrix in RREF while explaining your steps.

After exams are graded, it is possible that a grade adjustment (i.e. a curve) will be implemented; such an adjustment (if needed) depends on the performance of the class as a whole. For example, sometimes a given exam is too long for a 50 minute period and students aren't able to finish every problem, leading to low overall grades. See the syllabus for more details.